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### **REMARKS**

By this amendment, claim 6 has been amended. Claims 6 and 9-13 remain pending in the application for further consideration by the Examiner. In view of the amendments and the remarks that follow, it is believed that the application stands in condition for allowance and, as such, Applicant earnestly solicits a Notice of Allowance.

#### **Response to 35 USC §112 Rejection, First Paragraph**

Claim 6 was rejected under 35 USC §112, first paragraph, as failing to comply with the written description requirement. In particular, the Office Action states that "[g]ain and absorption balancing out one another when the injection current is "near" the threshold is new matter." Applicants have amended claim 6 to overcome this rejection.

In particular, claim 6 has been amended to recite that, at the threshold, the optical gain and optical loss within the semiconductor laser element are equal. As indicated in the Office Action, support for this amendment can be found, inter alia, on page 5, lines 10-25 and page 8, lines 10-14 of the Applicant's specification. In view of the foregoing, Applicant requests that the rejection under 35 USC §112 be withdrawn accordingly.

#### **Response to 35 USC §103(a) Rejections of Claims 6 and 9**

Claims 6 and 9 were rejected under 35 USC §103(a) as being unpatentable over U.S. Patent No. 4,608,682 ("Nagashima et al.") in view of U.S. Patent No. 6,026,108 ("Lim et al."). Claim 6 has been amended herein.

The relevant portions of Nagashima et al. (see, e.g., col. 4, lines 25 to 39 and Figure 3b) do not disclose, teach, or suggest at least the following elements of Applicant's claim 6, as currently amended:

- an injection current threshold of operation below which optical loss exceeds optical gain and above which optical gain exceeds optical loss; and/or
- the injection current having an amplitude at said threshold operation such that said optical gain and said optical loss are equal:

Rather, Nagashima et al. disclose an injection current  $i_b$  (injection current range  $i_a$  to  $i_c$ ) of which the laser is kept in either of its two distinct stable states A, B (see, e.g., Figure 3b). Lim et al. discloses feedback to control laser injection current, but not at an injection current threshold of (laser) operation (see, e.g., column 2, lines 3 to 10).

Consequently, neither Nagashima et al. nor Lim et al., either individually or in combination, teach or suggest maintaining injection current at the threshold level of operation. Moreover, the combination of Nagashima et al. and Lim et al. fails to teach or suggest

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maintaining injection current at the threshold level of operation so as to provide a buffering, e.g., memory, device.

One of the advantages of Applicant's invention in various embodiments is that, when the laser has to be reset by the injection current and hence the optical output being interrupted, the time to undertake this clearing operation is faster than if the laser was operating with a higher injection current. For example, this can be advantageous when data transmission rates are high because the time for the clearing is a significant factor in total speed of data handling.

Claim 9 is dependent on claim 6 and is therefore believed to be patentable for the same reasons set forth above for claim 6 as well as for other novel features recited therein.

In view of the foregoing, Applicant requests that the rejection of claims 6 and 9 under 35 USC §103(a) be withdrawn accordingly.

**Response to 35 USC §103(a) Rejections of Claims 10-13**

Claims 10-13 were rejected under 35 USC §103(a) as being unpatentable over Nagashima et al. in view of Lim et al., as applied to claims 6 and 9, and further in view of U.S. Patent No. 6,104,477 ("Yoshida et al."). Applicant respectfully traverses this rejection.

Claims 10-13 are dependent from base claim 6 and therefore include all the limitations of claim 6. Consequently, the foregoing remarks corresponding to the preceding 35 USC 103(a) rejection of claim 6 in view of Nagashima et al. and Lim et al. apply equally to dependent claims 10-13 and are incorporated by reference accordingly.

In particular, because the Nagashima et al. and Lim et al. references do not teach or suggest each and every limitation of base claim 6, as amended, and because the Yoshida et al. reference does not supply the missing limitations and therefore does not cure the deficiencies of the Nagashima et al. and Lim et al. references, dependent claims 10-13 are therefore believed to be patentable for the same reasons set forth above for base claim 6 in the preceding rejection as well as for other novel features therein. Applicant therefore respectfully requests that the Examiner withdraw the rejection of claims 10-13 under 35 USC §103(a).

**Examiner's "Response to Arguments" from the Previous Office Action**

Applicant acknowledges that the portions of Applicant's specification cited in the previous Office Action response (i.e., "page 5 to 8 and 21 to 25") were in error and apologize for any inconvenience brought about by this inadvertent error. The correct citation in Applicant's specification should have been – page 5, lines 5 to 8 and page 5 lines 21 to 25 –.

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**Conclusion**

In view of the foregoing, Applicant believes that all pending claims stand in condition for allowance. Accordingly, Applicant respectfully requests reconsideration of the application and passage of the case to issue.

Respectfully submitted,

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